

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
22 January 2004 (22.01.2004)

PCT

(10) International Publication Number
WO 2004/007183 A1

(51) International Patent Classification⁷: **B29C 69/00**

(21) International Application Number:
PCT/EP2003/007363

(22) International Filing Date: 9 July 2003 (09.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
102 31 867.0 12 July 2002 (12.07.2002) DE
60/405,445 20 August 2002 (20.08.2002) US

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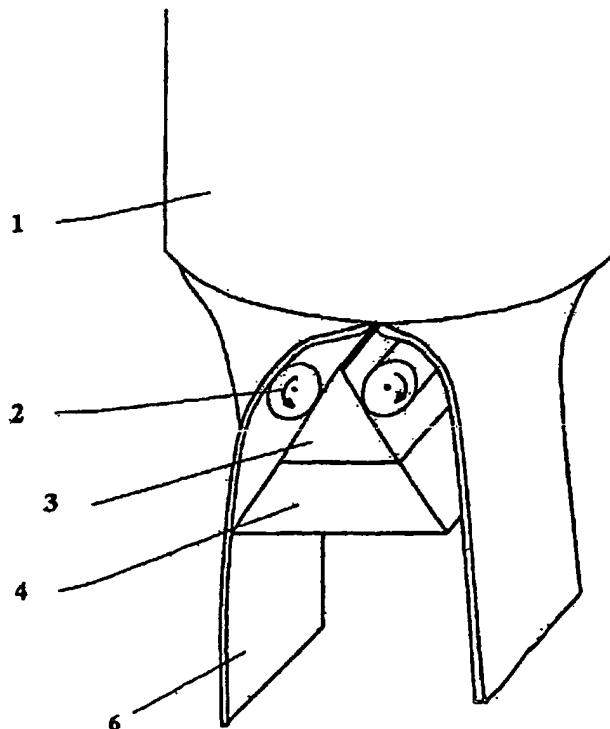
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(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,

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(54) Title: GIUDING OF A CUT-OPEN PARISON



(57) Abstract: The invention relates to a device for partitioning the plastic parisons to give at least one semifinished open-surface product (6), where the device encompasses at least one means of partitioning (3) the plastic parison and one means of drive (2). The means of drive may be composed of one, but preferably of two, driven rolls. It has been found that use of the device of the invention can reduce or prevent the production of creasing and irregularity at the margins, i.e. at the cut edges, of the partitioned parisons, i.e. of the resultant semifinished sheets.

WO 2004/007183 A1



SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Guiding of a cut-open parison

Description

5

The present invention relates to a device for partitioning a plastic parison to give one or more molten semifinished sheets.

- 10 DE 100 42 121 discloses a process for producing hollow plastic articles and encompassing the following steps:
- a) production of a tubular plastic parison on a blow molding or coextrusion blow molding plant
 - b) cutting the extruded or coextruded plastic parison
15 open to give at least one semifinished open-surface product
 - c) thermoforming of the resultant semifinished open-surface products to give half shells
 - d) welding of the thermoformed half shells to give a
20 hollow article

The principle of this process for producing hollow plastic articles is that a plastic parison produced on a blow molding or coextrusion blow molding plant is cut
25 open in an axial direction and the resultant molten semifinished sheets are placed in two thermoforming molds and formed to give the desired shape. This gives two half shells which can then be welded together at suitable temperatures, for example the temperature used
30 for thermoforming. Production of the semifinished open-surface products on a blow molding plant provides reproducible wall thickness control and thus high design freedom.

35 If a coextrusion blow molding plant is used, layers made from barrier polymers may be integrated into the semifinished product. If the semifinished product is single layer manufactured on a blow molding plant,

barrier layers may be applied subsequently, for example by fluorination or painting. These coatings are preferably applied after the half shells have been welded together. However, the coating procedures may also take place prior to the welding process, where appropriate prior to or after the attachment of incorporated parts to the half shells.

According to DE 100 42 121, the cutting of the plastic parison may take place prior to or after separation from the die of the extrusion head. It is also foreseen that the cutting of the plastic parison may actually take place during the extrusion process.

The abovementioned process separates the usually approximately cylindrical parison (tube) at one or more locations longitudinally, using the pressure or push effect of the upstream melt to move the parison over a cutting device, such as one or more knives. Another factor promoting this procedure in cases where the arrangement of the extrusion device is vertical is the gravitational force exerted by the discharged melt.

Serious disadvantages have been found to be associated with the use of the cutting devices conventionally used for separating webs of plastic, for example conventional steel blades. In particular, it has been found that adhesion of the molten plastic to the device or blade often occurs. This adhesion causes undesirable deformation of the parison and of the molten semifinished sheets obtained after the separation procedure. It has also been found that in many instances, in particular at the start of the extrusion procedure, the pressure exerted by the upstream melt is not sufficient for the desired cutting procedure to be carried out consistently. The resistance exerted by the cutting device or the knife on the parison is frequently so great that severe distortion of the

parison occurs, in particular at the start of the extrusion process, i.e. at the start of tube discharge from the die. The resultant cut edges, and the semifinished products themselves, are often
5 considerably deformed as a result (figure 3).

The problems described above are particularly relevant to parisons with especially high wall thickness. These problems can also be caused by some polymer materials
10 when they are used in parisons. If a parison with relatively high wall thickness is passed over a conventional cutting device, marked distortion and creasing occurs, in particular at the resultant cut edges.

15 It is an object of the present invention, therefore, to provide an apparatus which partitions plastic parisons, which does not have the abovementioned disadvantages of the prior art, and which can process parisons with
20 thin-and-thick layer walls, made from high-to (inclusive) low-molecular-weight and/or high-to (inclusive) low-density materials. The device of the invention can therefore process a wider spectrum of polymers, and the nature of the extrusion products may
25 be varied more widely. Further objects are apparent from the description of the invention hereinafter.

We have found that this object is achieved by the features of claim 1.

30 Advantageous embodiments of the device of the invention are defined in the subclaims.

The invention provides a device for partitioning a
35 plastic parison to give at least one semifinished open-surface product, where the device encompasses at least one means of partitioning the plastic parison and

encompasses at least one means of drive or one draw-off mechanism.

It has been found that the abovementioned problems can
5 be overcome by equipping a device for partitioning a
plastic parison with a drive system which draws off or
transports the parison and/or the resultant molten
semifinished sheet products. The effect of the draw-off
mechanism is that the parison and, respectively, the
10 semifinished products are pulled over the means of
partitioning the plastic parison, this means being
termed hereinafter a cutting device, thus compensating
the resistance described above exerted by the cutting
device on the parison, or the forces arising.

15 The parisons partitioned by the device of the
invention, or the resultant semifinished sheets, have
no, or comparatively low levels of, creasing or
irregularity, in particular at the margins, i.e. at the
20 cut edges (figure 4).

One particularly preferred drive system encompasses
roller-type driven units, such as pneumatic floating
rollers. However, driven devices of the invention also
25 include driven belts, for example, or other suitable
driven units. The driven units exert tension on the
parison and, respectively, the semifinished products.
This tension acts together with the compression brought
about by the extrusion process to guide the parison in
30 the desired manner consistently over the cutting
device.

It is also preferable that the driven units are smooth,
profiled, or grooved, or have a suitable coating, in
35 order to ensure sufficient friction and, respectively,
continuous transport of the thermoplastic composition.

According to the invention, it is particularly preferable to use two pneumatically driven rolls as a means of drive. The use of driven rollers or driven rolls, preferably installed in the direct vicinity of the cutting device, has the additional advantage that the parison section is distanced immediately from the cutting device after separation of the parison, thus avoiding adhesion of the semifinished sheets to the device.

10

In one particularly preferred embodiment, the driven rolls are integrated within the cutting device. An example of a method for achieving this sets the means of drive, preferably the driven roll(s), into recesses on the means of partitioning the plastic parison.

According to the invention, the driven rolls may also be installed separately, i.e. outside the cutting device.

20

The device for partitioning the annular tube to give one or more molten semifinished sheets may in principle encompass almost any desired cutting devices and, respectively, knife designs and knife geometries. For example, the cutting device may encompass sharp-edged cutting units which may also, where appropriate, be exchangeable. Besides sharp-edged devices, use may also be made of edgeless, rectangular, or bar-shaped devices functioning as a knife or separator. However, a means of partitioning the plastic parison which encompasses a body of triangular cross section which has been arranged transversely to the direction of extrusion has proven particularly advantageous.

It has proven advantageous for the cutting device used, which preferably encompasses a body made from metal or plastic, preferably with triangular cross section, to be provided with a coating which inhibits adhesion of

the hot molten plastic. Suitable coatings encompass polytetrafluoroethylene, for example.

5 The nature of the surface of the cutting device may be smooth or else grooved.

10 In another preferred embodiment of the present invention, the device of the invention encompasses a holder for the means of partitioning the plastic parison and/or for the means of drive. The design of this holder is preferably such that it functions as a spacer for the semifinished open-surface products, so ensuring that undesirable contact between the semifinished products after the separation procedure is
15 avoided, and free space is created for components and devices to be introduced.

20 In another particularly preferred embodiment, the device of the invention is equipped with means of guiding the semifinished open-surface products. The means of guiding particularly preferably encompasses at least two guide rollers, which may, where appropriate, be driven, and can preferably be moved transversely to the direction of extrusion. The moveability of the
25 guide rollers transversely to the direction of extrusion permits controlled setting of the distance between the semifinished products obtained.

30 The abovementioned means of guiding or guide rollers may be used not only to control the distance between the semifinished products obtained but also to preform, and in particular flatten, the semifinished products. The device of the invention illustrated in figure 2 has guide rollers as well as the abovementioned driven
35 rollers.

Another embodiment of the invention provides, if required, for the holder, the means of partitioning the

plastic parison, the means of guiding, and/or the means of drive to be fully or else partially heatable, or coolable, or capable of being heated or cooled as desired. If advantageous, it is also possible for
5 certain regions to be heated while at the same time other regions are cooled.

The relative velocity of parison and, respectively, parison section to the means of drive here may vary.
10

The invention further provides the use of the device of the invention for partitioning an extruded or coextruded plastic parison to give at least one semifinished open-surface product.
15

Figure 1 is a diagram of a device of the invention for partitioning a plastic parison. The plastic parison is discharged as a tube from the die of the extrusion device (1). A body (3), optionally coolable, with a
20 triangular cross section, arranged transversely to the direction of extrusion, functions as a cutting device or means of partitioning the plastic parison. The device also encompasses a heatable holder (4) on which the cutting device has been installed. Two
25 pneumatically driven rolls (2) arranged in the immediate vicinity of the cutting device function as a means of drive of the invention. Installation in the immediate vicinity of the body (3) has the advantage that the two resultant parison sections (6) are
30 distanced from the cutting device immediately after separation of the parison, and adhesion of the semifinished sheets to the device is therefore avoided. The tension exerted by the driven rolls (2) guides the plastic parison consistently over the cutting device,
35 and the resultant semifinished sheets therefore have no, or comparatively very little, creasing or irregularity at the margins, i.e. at the cut edges.

Figure 2 is a diagram of another device of the invention for partitioning a plastic parison. The device shown in figure 2 differs from the device of figure 1 merely in the presence of two guide rollers (5) additionally installed. These guide rollers eliminate undesirable contact between the semifinished products (6) after the separation procedure and also provide the desired free space for components and devices to be introduced. The guide rollers (5) can be moved transversely to the direction of extrusion. The moveability of the guide rollers transversely to the direction of extrusion permits controlled setting of the distance between the semifinished products obtained. The driven rolls (2) in the device of figure 2 have been set into or integrated into the cutting device (3).

Figure 3 depicts the distortion of the parison when devices not according to the invention are used (without a means of drive). The outcome is considerable deformation of the resultant cut edges, and also of the semifinished products themselves.

Figure 4 depicts the device of the invention and the resultant partitioned parisons or resultant semifinished sheets. These have no creasing or irregularity, in particular at the margins, i.e. at the cut edges. The polymer processed was the same as that in figure 3.

We claim:

1. A device for partitioning a plastic parison to
give at least one semifinished open-surface product,
5 using at least one means of partitioning the plastic
parison, wherein the device encompasses at least one
means of drive.
2. A device as claimed in claim 1, wherein the means
10 of drive is a smooth, profiled, grooved, and/or coated
surface.
3. A device as claimed in claim 1 or 2, wherein the
means of drive encompasses at least one, preferably at
15 least two driven rolls.
4. A device as claimed in claim 1, 2, or 3, wherein
the means of partitioning the plastic parison has
sharp-edged, where appropriate exchangeable, cutting
20 units and/or edgeless, preferably bar-shaped units.
5. A device as claimed in any of the preceding
claims, wherein the means of partitioning the plastic
parison is a body of triangular cross section which has
25 been arranged transversely to the direction of
extrusion.
6. A device as claimed in claim 4 or 5, wherein the
body or the unit is metallic and preferably has a
30 coating of plastic.
7. A device as claimed in any of the preceding
claims, wherein the device has a holder for the means
of partitioning the plastic parison and/or for the
35 means of drive.

8. A device as claimed in claim 7, wherein the design of the holder is such that it functions as spacer for the semifinished open-surface products.

5 9. A device as claimed in any of the preceding claims, wherein the holder, the means of partitioning the plastic parison, and/or the means of drive is heatable, or is coolable, or can be heated or cooled as desired.

10

10. A device as claimed in any of the preceding claims, wherein the means of drive, preferably the driven roll(s), has been set into recesses on the means of partitioning the plastic parison.

15

11. A device as claimed in any of the preceding claims, wherein the device has a means of guiding the semifinished open-surface products.

20 12. A device as claimed in claim 11, wherein the means of guiding encompasses guide rollers which may, where appropriate, be driven, and can preferably be moved transversely to the direction of extrusion.

25 13. The use of the device as claimed in any of the preceding claims for partitioning an extruded or coextruded plastic parison to give at least one semifinished open-surface product.

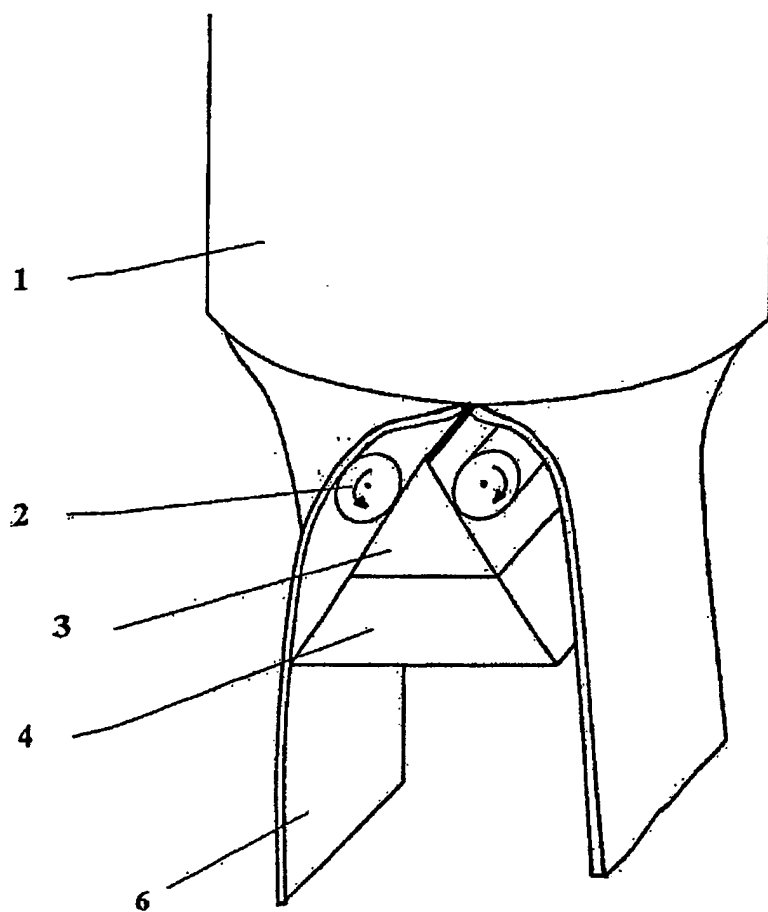


FIGURE 1

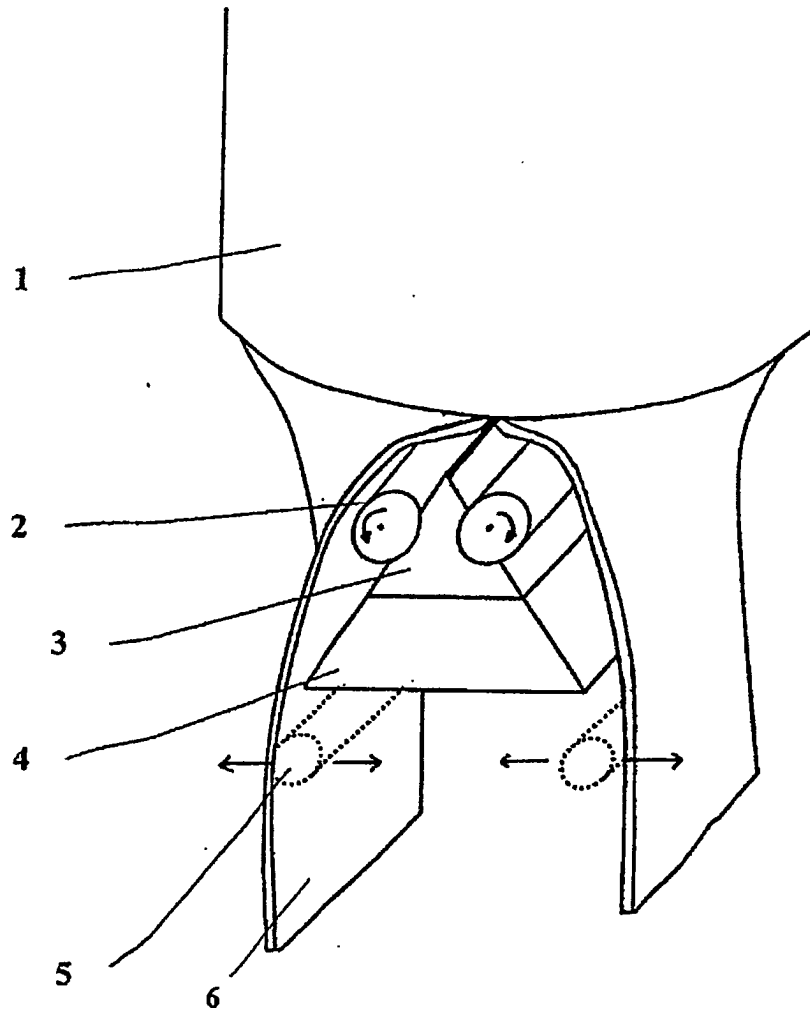
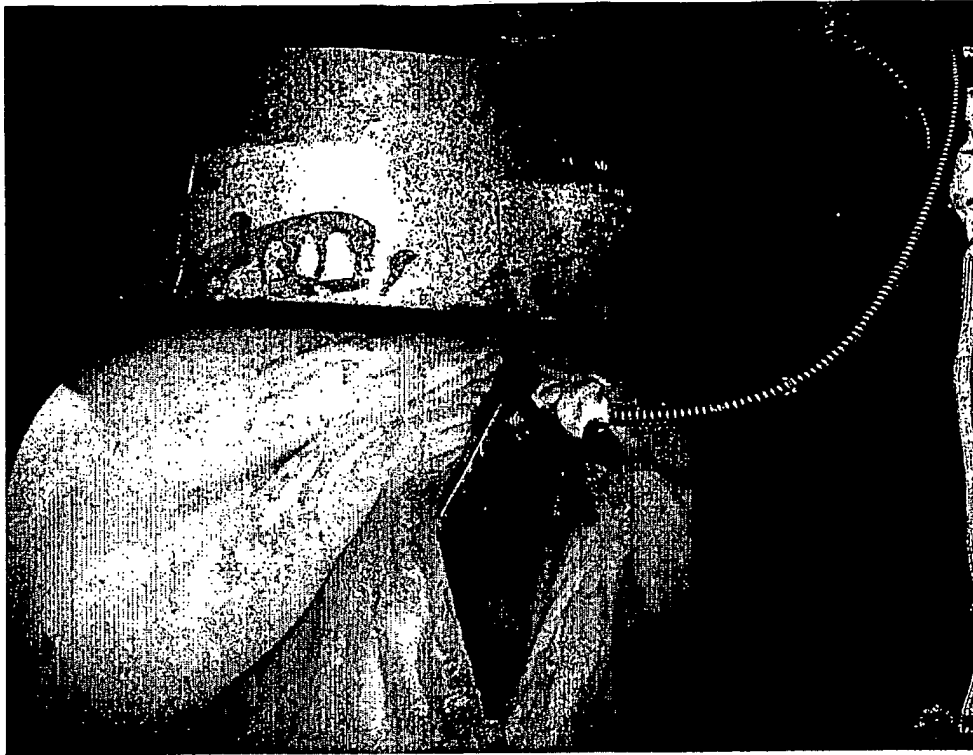


FIGURE 2



Figur 3



Figur 4

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/07363

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 B29C69/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 B29C		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, PAJ, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 011, no. 120 (M-580), 15 April 1987 (1987-04-15) & JP 61 261021 A (KYORAKU CO LTD), 19 November 1986 (1986-11-19)	1-6, 11-13
Y	abstract; figures 1-6	7,8
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Y	abstract; figures 2,3	7,8
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art *Z* document member of the same patent family		
Date of the actual completion of the international search 12 November 2003		Date of mailing of the international search report 28/11/2003
Name and mailing address of the ISA European Patent Office, P.B. 6818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Labeeuw, R

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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